# ProcessDefender

## Modbus Communication Programming Manual

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# 1 About this document

This document defines the usage of the Modbus features of the ProcessDefender system.

# 2 Configuration

## 2.1 Slave ID

Any value between 0 and 255 can be entered.

## 2.2 Baud Rate

The following baud rates are supported.

| Baud Rate | | | | | |
|---|---|---|---|---|---|
| 4800 | 9600 | 14400 | 19200 | 24000 | 28800 |
| 33600 | 38400 | 43200 | 48000 | 52800 | 57600 |
| 62400 | 67200 | 72000 | 76800 | 81600 | 86400 |
| 91200 | 96000 | 100800 | 105600 | 110400 | 115200 |
| 120000 | 124800 | 129600 | 134400 | 139200 | 144000 |
| 148800 | 153600 | 158400 | 163200 | 168000 | 172800 |
| 177600 | 182400 | 187200 | 192000 | | |

## 2.3 Stop Bits & Parity

The following combinations of Stop bits, and Parity bits are supported.

- 2 Stop bits and No Parity bits
- 1 Stop bit and an Even Parity bit
- 1 Stop Bit and an Odd Parity bit

## 2.4 Function Codes

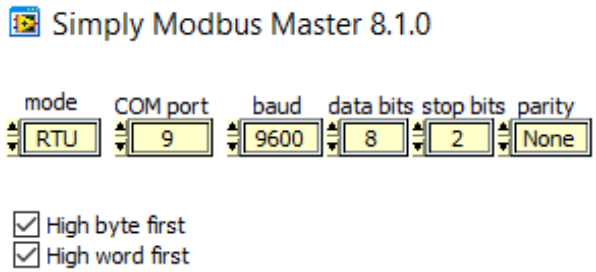
| Function Codes | |
|---|---|
| **Code** | **Function** |
| 1 | Read Coil Registers |
| 3 | Read Holding Registers |
| 4 | Read Input Registers |
| 15 | Write Coil Registers |
| 16 | Write Holding Register |
| 32 | Read Config Register |
| 33 | Write Config Register |

## 2.5 Error Codes

| Error Codes | |
|---|---|
| **Code** | **Error** |
| 1 | Unsupported Function |
| 2 | Illegal Data Address |

## 2.6 Examples

Examples shown use Simply Modbus Master 8.1.0




## 2.7 Registers

Configuration memory consists of an array of 768 bytes. A register may be comprised of a single byte (8 bit integer), two bytes (16 bit integer), three bytes (24 bit float), and four bytes (32 bit float).

Some PLC's don't support the easy use of floating point numbers, and so they can be accessed as 16 bit integers. For those registers that require values outside the range of integers, alternative address ranges provide the ability to scale the values by 0.001
Eg.
To read register "Relay 2 Hysteresis %" which contains the value 12.345
Read value

| Floating point value | Register address | Return type | Return value |
|---|---|---|---|
| 12.345 | 4168 | 32 bit floating point | 12.345 |
| 12.345 | 6168 | 16 bit integer | 12 |
| 12.345 | 8168 | 16 bit integer | 12345 |

To write register "Relay 2 Hysteresis %" with 10.25 (or the value nearest to it)

| Value to write | Value type | Address | Value written |
|---|---|---|---|
| 10.25 | 32 bit float | 4168 | 10.25 |
| 10 | 16 bit integer | 6168 | 10.00 |
| 10250 | 16 bit integer | 8168 | 10.25 |

# 3 Register Address Ranges

## 3.1 Read Coil Registers (Function code 1)

| Coil Address | Function | Message limits |
|---|---|---|
| 0 to 31 | Product Status (alarms, outputs, overrange flags) | Max 32 bits in one operation |
| 1000 to 7144 | Configuration bits | Max 1551 bits in one operation |

## 3.2 Read Holding Registers (Function code 3)

| Register Address | Function | Message limits |
|---|---|---|
| 1000 to 1767 | Configuration bytes (8 bits) | One byte per message |
| 2000 to 2766 | Configuration integers (16 bits) | One integer per message |
| 3000 to 3765 | Configuration floats (24 bits) | One float per message |
| 4000 to 4764 | Configuration floats (32 bits) | One float per message |
| 5000 to 5765 | Configuration floats (24 bits)<br>Value=Integer(Float) | One float per message<br>Integer steps (0 DP) |
| 6000 to 6764 | Configuration floats (32 bits)<br>Value=Integer(Float) | One float per message<br>Integer steps (0 DP) |
| 7000 to 7765 | Configuration floats (24 bits)<br>Value=Integer(Float*1000) | One float per message<br>Steps of 0.001 (3 DP) |
| 8000 to 8764 | Configuration floats (32 bits)<br>Value=Integer(Float*1000) | One float per message<br>Steps of 0.001 (3 DP) |

## 3.3 Read Input Registers (Function code 4)

| Register Address | Function | Message limits |
|---|---|---|
| 0 to 89 | Product Live Parameters (Voltages, Currents, etc) | 89 floats in one message |
| 100 to 189 | Product Live Parameters<br>Value=Integer(Float) | One float per message |
| 200 to 289 | Product Live Parameters<br>Value=Integer(Float*1000) | One float per message |
| 300 to 389 | Product Live Parameters<br>Value=Integer(Float/1000) | One float per message |

## 3.4 Write Coil Registers (Function code 15)

| Coil Address | Function | Message limits |
|---|---|---|
| 1000 to 7144 | Configuration bits | Max 1 bit in one operation |

## 3.5 Write Holding Register (Function code 16)

| Register Address | Function | Message limits |
|---|---|---|
| 1000 to 1767 | Configuration bytes (8 bits) | One byte per message |
| 2000 to 2766 | Configuration integers (16 bits) | One integer per message |
| 3000 to 3765 | Configuration floats (24 bits) | One float per message |
| 4000 to 4764 | Configuration floats (32 bits) | One float per message |
| 5000 to 5765 | Configuration floats (24 bits)<br>Value=Float(Integer) | One integer per message<br>0 DP |
| 6000 to 6764 | Configuration floats (32 bits)<br>Value=Float(Integer) | One integer per message<br>0 DP |
| 7000 to 7765 | Configuration floats (24 bits)<br>Value=Float(Integer)/1000 | One integer per message<br>3 DP |
| 8000 to 8764 | Configuration floats (32 bits)<br>Value=Float(Integer)/1000 | One integer per message<br>3 DP |

## 3.6 Read Config Register (Function code 32)

Registers are proprietary.

## 3.7 Write Config Register (Function code 33)

Registers are proprietary.

# 4 Register Usage (Normal Operation)

## 4.1 Read Input Registers

Function Code 4

The registers are implemented as 32 bit floats, formatted according to the IEEE-754 standard.

The registers can be accessed as full 32 bit floats or by truncating the value to 16 bit integers.

When using 16 bit integers, the value can be manipulated before transmission:-

a) the value can be truncated, limiting the range between 0 and 65535.

b) The value can be multiplied by 1000 first and then truncated, eg. 50.125 Hz is returned as 50125. The limits are between 0 and 65.535

c) The value can be divided by 1000 first and then truncated, eg. 144000 W is returned as 144. The limits are between 0 and 65535000.

When using 32 bit floats, these are transmitted as two 16 bit integers, the most significant integer is sent first.

16 bit integers are sent as two 8 bit bytes, the most significant byte is sent first.

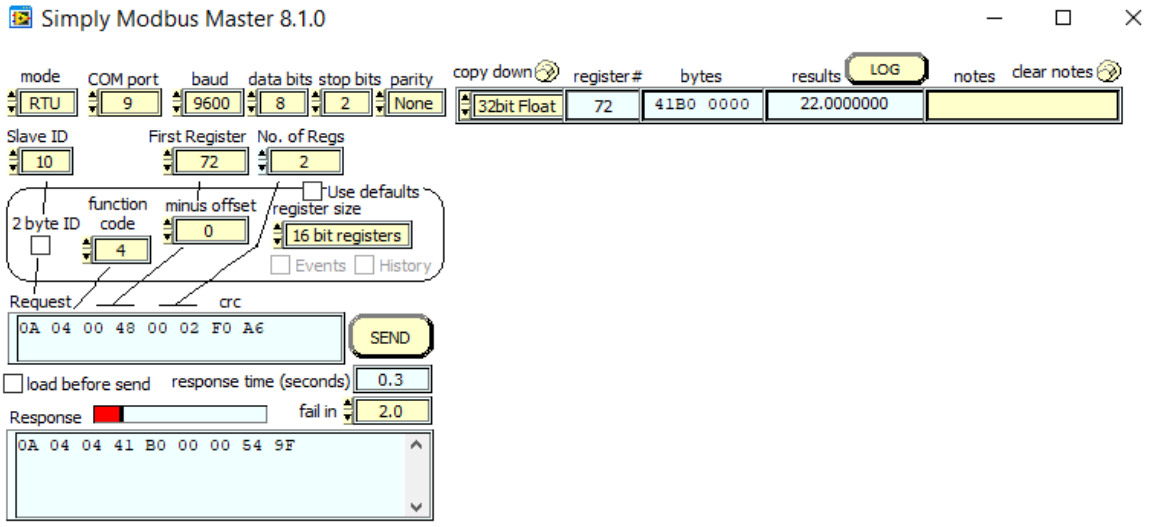
Odd addresses are truncated to even addresses (reading address 1 will read contents from address 0)

### 4.1.1 Example 32 bit float

Read from unit address 10, using function code 4, address 72 (internal temperature), a single 32 bit float.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 04 | 00 48 | 00 02 | | | F0 A6 |
| RX | 0A | 04 | | | 04 | 41 B0 00 00 | A0 15 |

41 B0 00 00 is the IEEE-754 representation of 22.0 DegC




### 4.1.2 Example 16 bit integer with 0 DP (100 address offset)

Read from unit address 1, using function code 4, address 72 (internal temperature), a single 16 bit integer.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 01 | 04 | 00 AC | 00 01 | | | F1 EB |
| RX | 01 | 04 | | | 02 | 00 16 | 38 FE |

00 16 is the hexadecimal representation of 22.0 DegC

### 4.1.3 Example 16 bit integer with 3 DP (200 address offset)

Read from unit address 1, using function code 4, address 72 (internal temperature), a single 16 bit integer.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 01 | 04 | 01 10 | 00 01 | | | 31 F3 |
| RX | 01 | 04 | | | 02 | 55 F0 | 86 24 |

55 F0 is the hexadecimal representation of 22000 (22.000) DegC

### 4.1.4 Example 16 bit integer with -3 DP (300 address offset)

Read from unit address 1, using function code 4, address 72 (internal temperature), a single 16 bit integer.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 01 | 04 | 01 74 | 00 01 | | | 70 2C |
| RX | 01 | 04 | | | 02 | 00 00 | B9 30 |

Result is zero as the temperature is less than 1000 DegC (result = int(22/1000))

| Reg | Details | Units |
|---|---|---|
| 0 | Frequency | Hz |
| 2 | L1 to L2 Voltage | V |
| 4 | L1 to N Voltage | V |
| 6 | L1 Current | A |
| 8 | L1 Active Power | W |
| 10 | L1 Apparent Power | VA |
| 12 | L1 Reactive Power | VAr |
| 14 | L1 Current Phase Angle | Degrees |
| 16 | L1 Power Factor | 0.0 to 1.0 |
| 18 | L1 Voltage THD | % |
| 20 | L1 Current THD | % |
| 22 | L1 Rated Load, percentage of | % |
| 24 | L1 to L2 Voltage Phase Angle | Degrees |
| 26 | L2 to L3 Voltage | V |
| 28 | L2 to N Voltage | V |
| 30 | L2 Current | A* |
| 32 | L2 Active Power | W* |
| 34 | L2 Apparent Power | VA* |
| 36 | L2 Reactive Power | VAr* |
| 38 | L2 Current Phase Angle | Degrees* |

| Reg | Details | Units |
|---|---|---|
| 40 | L2 Power Factor | 0.0 to 1.0* |
| 42 | L2 Voltage THD | % |
| 44 | L2 Current THD | %* |
| 46 | L2 Rated Load, percentage of | %* |
| 48 | L1 to L3 Voltage Phase Angle | Degrees |
| 50 | L3 to L1 Voltage | V |
| 52 | L3 to N Voltage | V |
| 54 | L3 Current | A* |
| 56 | L3 Active Power | W* |
| 58 | L3 Apparent Power | VA* |
| 60 | L3 Reactive Power | VAr* |
| 62 | L3 Current Phase Angle | Degrees* |
| 64 | L3 Power Factor | 0.0 to 1.0* |
| 66 | L3 Voltage THD | % |
| 68 | L3 Current THD | %* |
| 70 | L3 Rated Load, percentage of | %* |
| 72 | Internal Temperature | Deg C |
| 80 | Total Active Power | W* |
| 82 | Total Apparent Power | VA* |
| 84 | Total reactive power | VAr* |
| 88 | Total Apparent Power (HP) | HP* |

*Assumes a balanced load when only 1 CT connected.

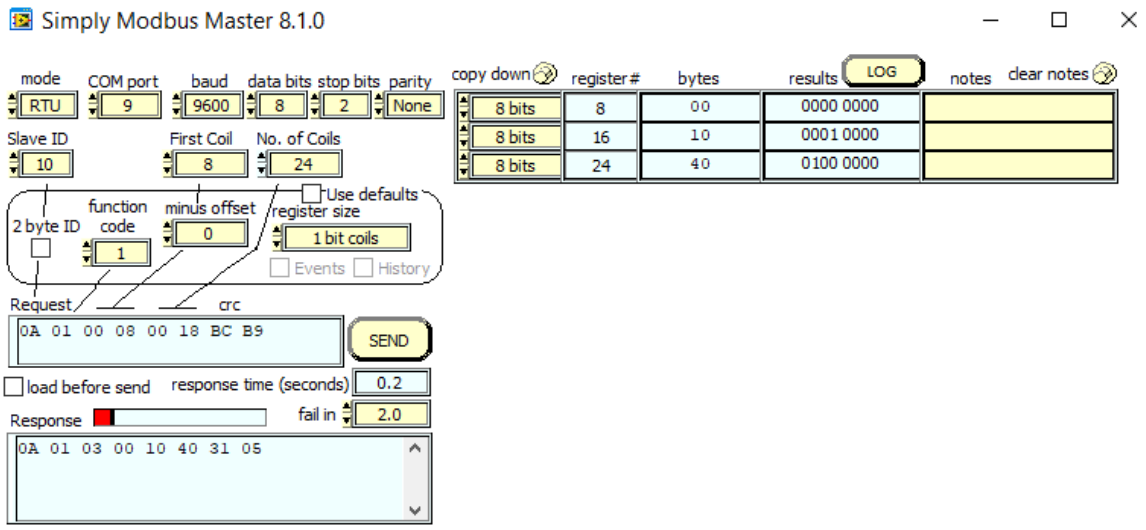
## 4.2 Read Coil Registers (1 bit coils)

Function Code 1

Read from unit address 10, using function code 1, read coils 8 to 31.

| | Unit | Func | 1St Coil | No Of coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 00 08 | 00 18 | | | BC B9 |
| RX | 0A | 01 | | | 03 | 00 10 40 | 31 05 |

00 10 40 Coils 20 and 30 are set




| Address | Type | Details | States |
|---|---|---|---|
| 0 | 1bit | Main Alarm Above | 1=Active, 0=Inactive |
| 1 | 1bit | Main Alarm Below | 1=Active, 0=Inactive |
| 2 | 1bit | Pre Alarm Above | 1=Active, 0=Inactive |
| 3 | 1bit | Pre Alarm Below | 1=Active, 0=Inactive |
| 4 | 1bit | General Alarm Above | 1=Active, 0=Inactive |
| 5 | 1bit | General Alarm Below | 1=Active, 0=Inactive |
| 8 | 1bit | Motor Run Detection | 1=Running, 0=Static |
| 21 | 1bit | Relay 1 state | 1=Active, 0=Inactive |
| 22 | 1bit | Relay 2 state | 1=Active, 0=Inactive |
| 23 | 1bit | Relay 3 state | 1=Active, 0=Inactive |
| 24 | 1bit | Phase 1 overvoltage (PD Hardware limit) | 1=OverVoltage |
| 25 | 1bit | Phase 1 overcurrent (PD Hardware limit) | 1=OverCurrent |
| 26 | 1bit | Phase 2 overvoltage (PD Hardware limit) | 1=OverVoltage |
| 27 | 1bit | Phase 2 overcurrent (PD Hardware limit) | 1=OverCurrent |
| 28 | 1bit | Phase 3 overvoltage (PD Hardware limit) | 1=OverVoltage |
| 29 | 1bit | Phase 3 overcurrent (PD Hardware limit) | 1=OverCurrent |

| Address | Type | Details | States |
|---|---|---|---|
| 30 | 1bit | Phase 1 no current detected | 1=No current |

# 5 Register Usage (Configuration)

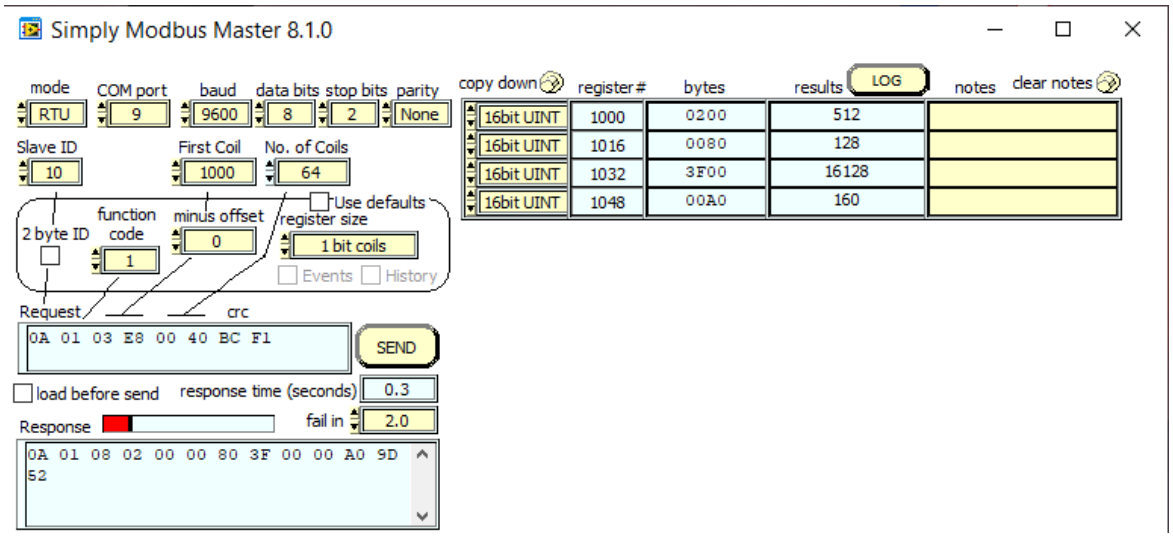
## 5.1 Read Coil Registers (1 bit coils)

Function Code 1

Read from unit address 10, using function code 1, read coils 1000 to 1063.

| | Unit | Func | 1St Coil | No Of coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 03 E8 | 00 40 | | | BC F1 |
| RX | 0A | 01 | | | 08 | 02 00 00 80 3F 00 00 A0 | 9D 52 |

02 00 00 80 3F 00 00 A0 Coils 1001, 1031, 1032 to 1037, 1061, and 1063 are set



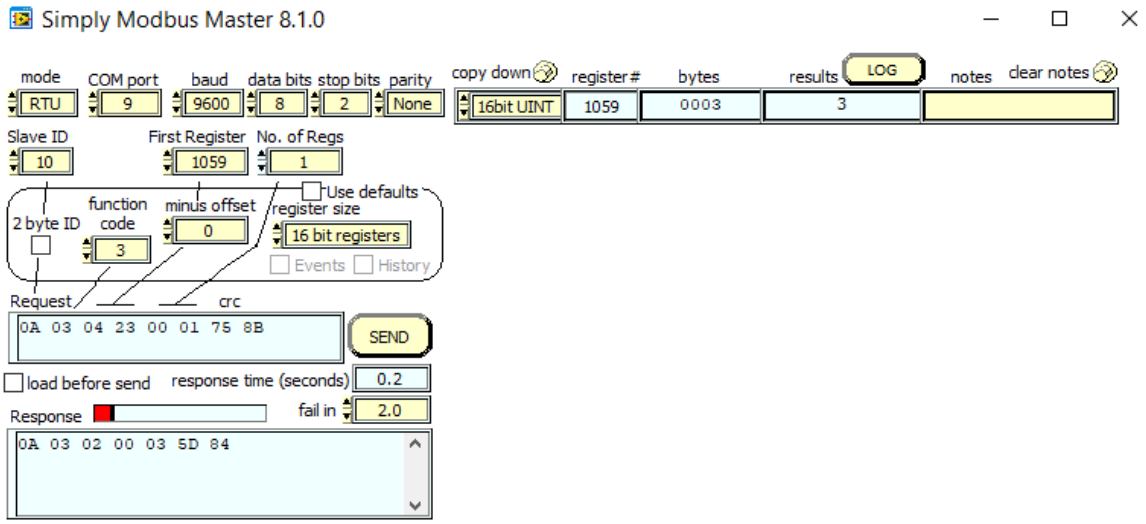
## 5.2 Read Holding Register (8 bit byte)

Function Code: 3
Address offset: 1000

Read the 8 bit byte at address 59 and return as a 16 bit integer
Address accessed: 1059

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 04 23 | 00 01 | | | 75 8B |
| RX | 0A | 03 | | | 02 | 00 03 | 5D 84 |

The first byte is null data (zero), the second byte is the byte requested.

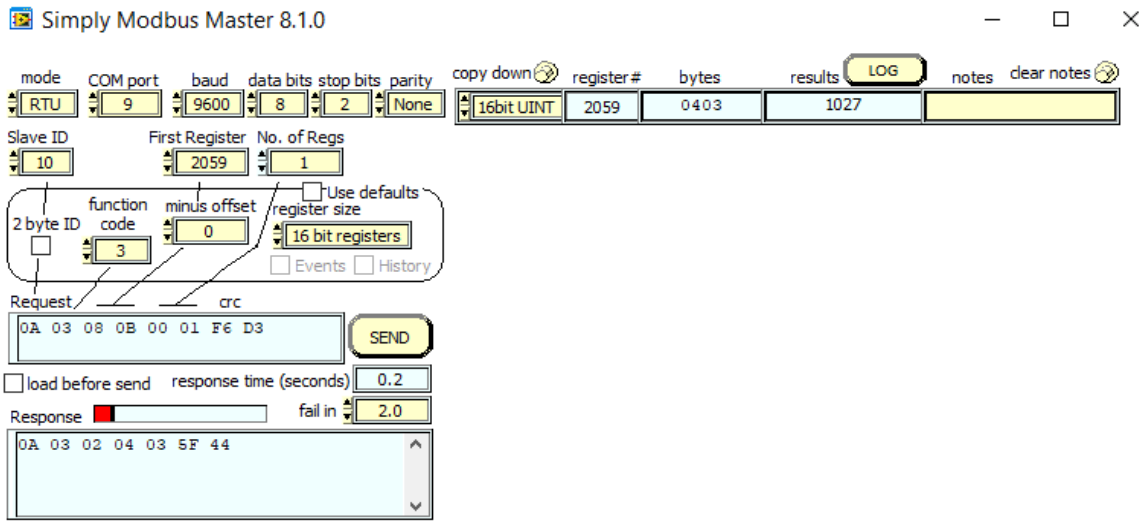


## 5.3 Read Holding Register (16 bit integer)

Function Code: 3
Address offset: 2000

Read the 16 bit integer at address 59 and return as a 16 bit integer
Address accessed: 2059

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 08 0B | 00 01 | | | F6 D3 |
| RX | 0A | 03 | | | 02 | 04 03 | 5F 44 |



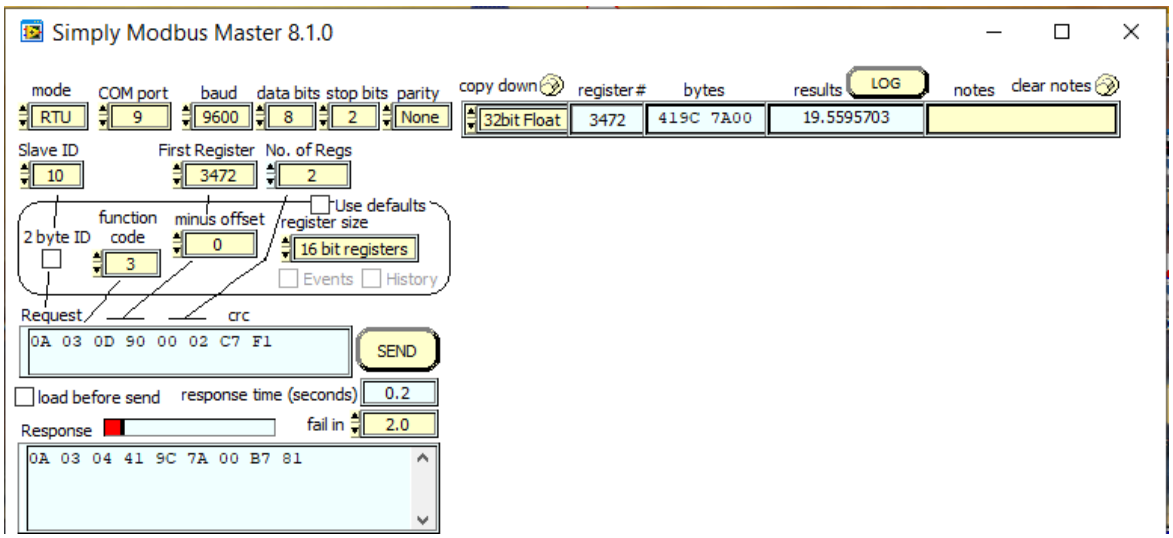
## 5.4 Read Holding Register (24 bit float)

Function Code: 3
Address offset: 3000

Read the 24 bit float at address 472 and return as a 32 bit float
Address accessed: 3472

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0D 90 | 00 02 | | | C7 F1 |
| RX | 0A | 03 | | | 04 | 41 9C 7A 00 | B7 81 |

The fourth byte is null data (zero), the first to third bytes are the data requested.
Returned value is 19.5595703



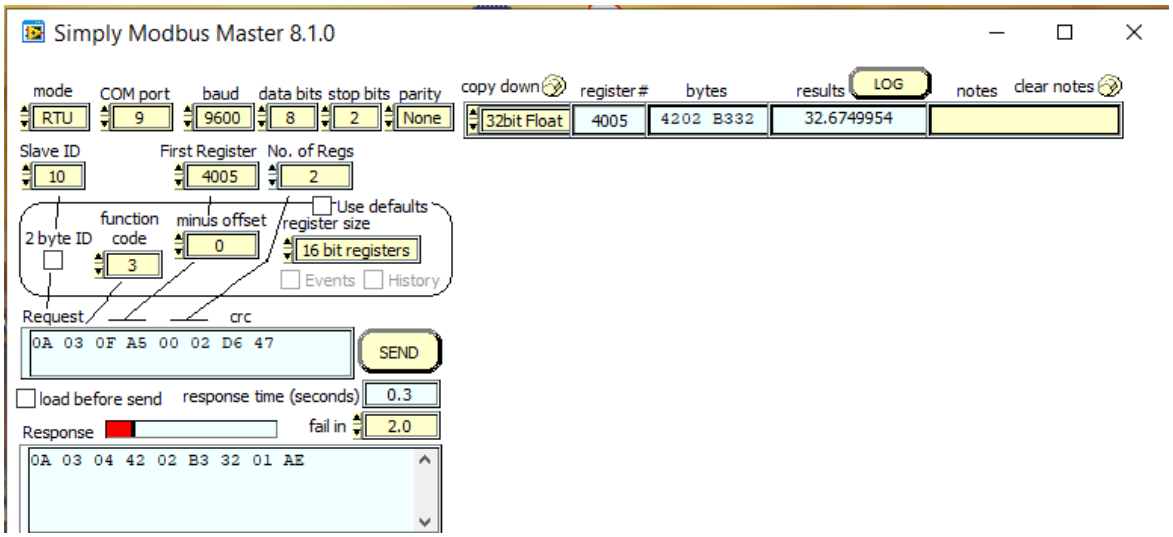
## 5.5 Read Holding Register (32 bit float)

Function Code: 3
Address offset: 4000

Read the 32 bit float at address 5 and return as a 32 bit float
Address accessed: 4005

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0F A5 | 00 02 | | | D6 47 |
| RX | 0A | 03 | | | 04 | 42 02 B3 32 | 01 AE |

Returned value is 32.6749954



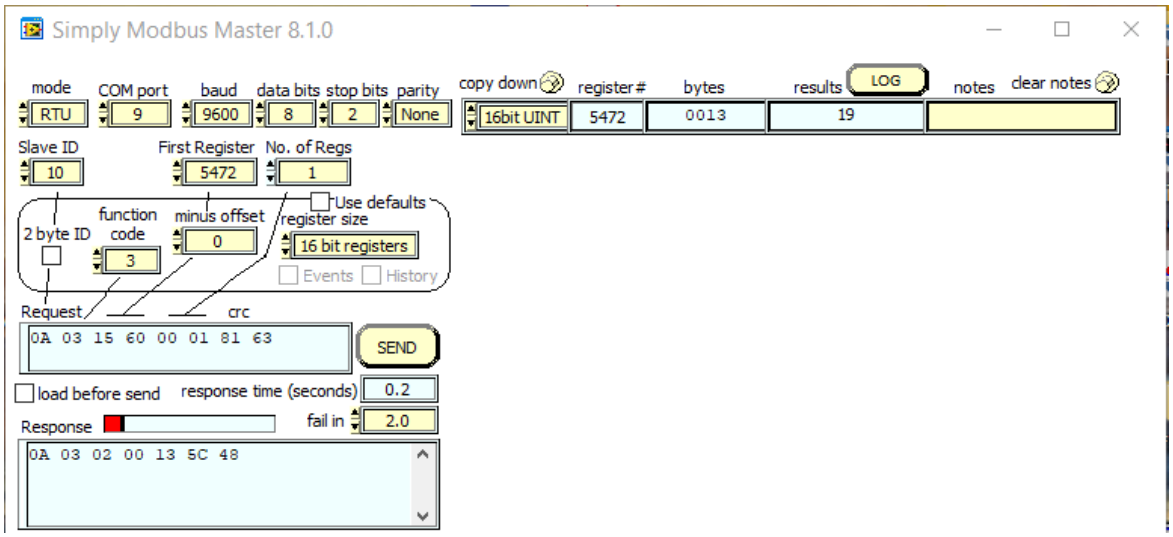
## 5.6 Read Holding Register (24 bit float, as a 16 bit integer)

Function Code: 3
Address offset: 5000

Read the 24 bit float at address 472 and return as a 16 bit integer
Address accessed: 5472

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 15 60 | 00 01 | | | 81 63 |
| RX | 0A | 03 | | | 02 | 00 13 | 5C 48 |

Note. The value should be 19.5595703 but is truncated to 19 as an integer.



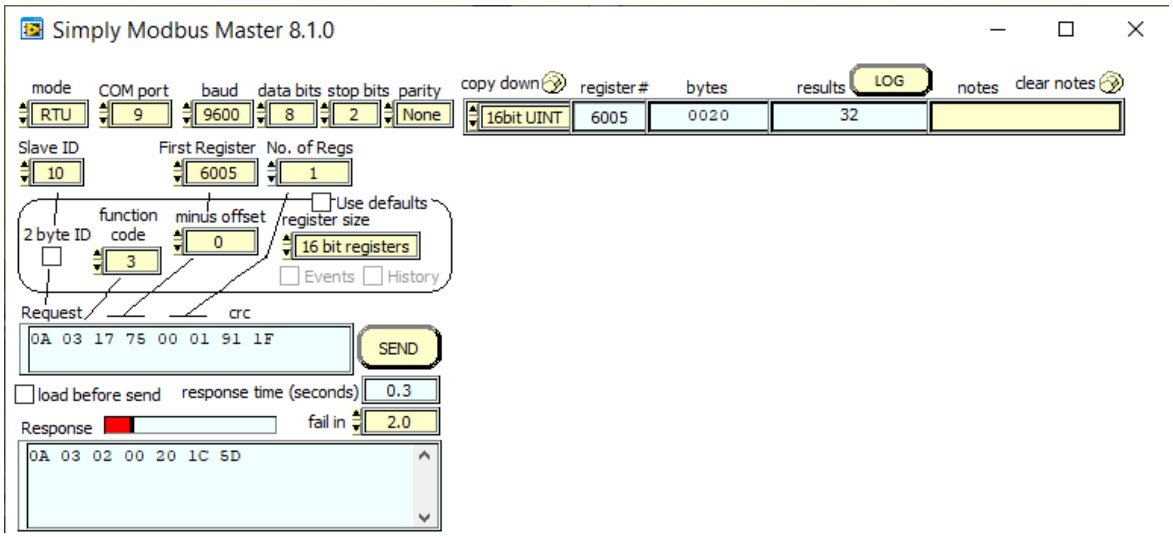
## 5.7 Read Holding Register (32 bit float, as a 16 bit integer)

Function Code: 3
Address offset: 6000

Read the 32 bit float at address 5 and return as a 16 bit integer
Address accessed: 6005

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 17 75 | 00 01 | | | 91 1F |
| RX | 0A | 03 | | | 02 | 00 20 | 1C 5D |

Note. The value should be 32.6749954 but is truncated to 32 as an integer.



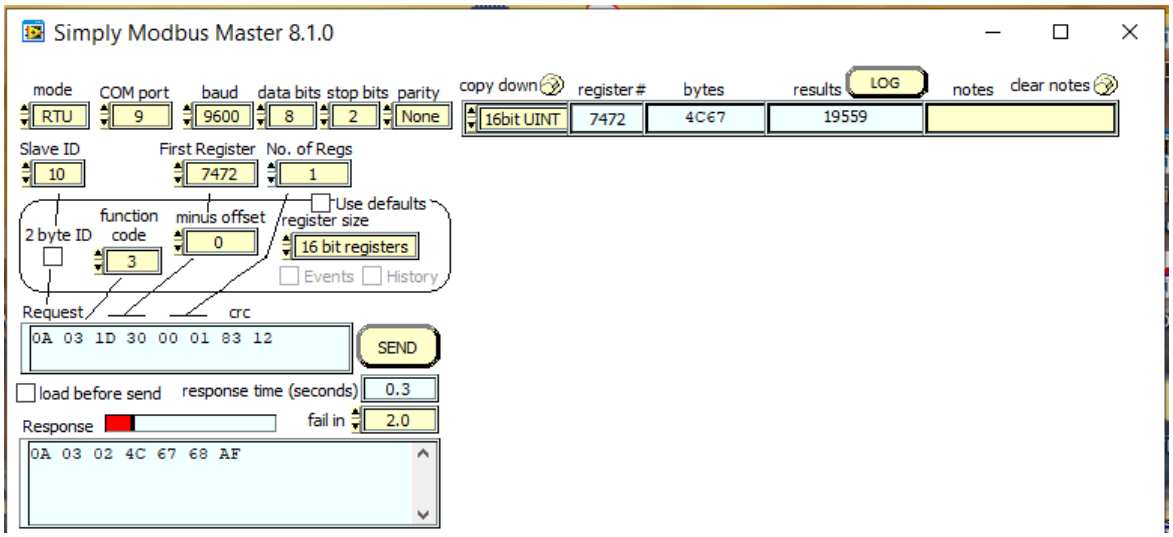
## 5.8 Read Holding Register (24 bit float, *1000, as a 16 bit integer)

Function Code: 3
Address offset: 7000

Read the 24 bit float at address 472, multiply by 1000, and return as a 16 bit integer
Address accessed: 7472

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 1D 30 | 00 01 | | | 83 12 |
| RX | 0A | 03 | | | 02 | 4C 67 | 68 AF |

Note. The value should be 19.5595703 but is shifted to 19559 and then truncated to an integer.



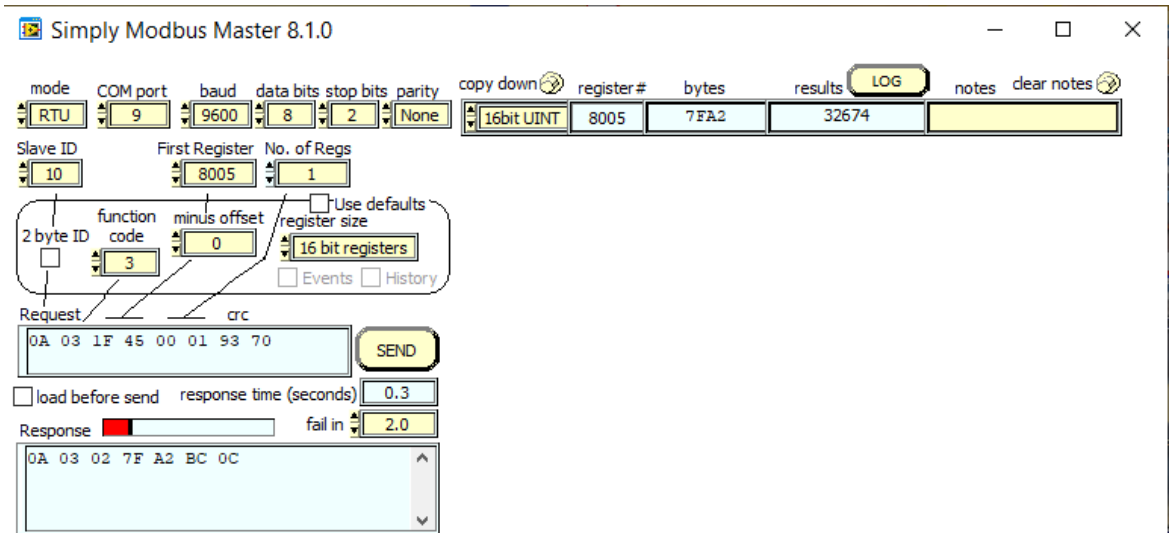
## 5.9 Read Holding Register (32 bit float, *1000, as a 16 bit integer)

Function Code: 3
Address offset: 8000

Read the 32 bit float at address 5, multiply by 1000, and return as a 16 bit integer
Address accessed: 8005

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 1F 45 | 00 01 | | | 93 70 |
| RX | 0A | 03 | | | 02 | 7F A2 | BC 0C |

Note. The value should be 32.6749954 but is shifted to 32674 and truncated to an integer.

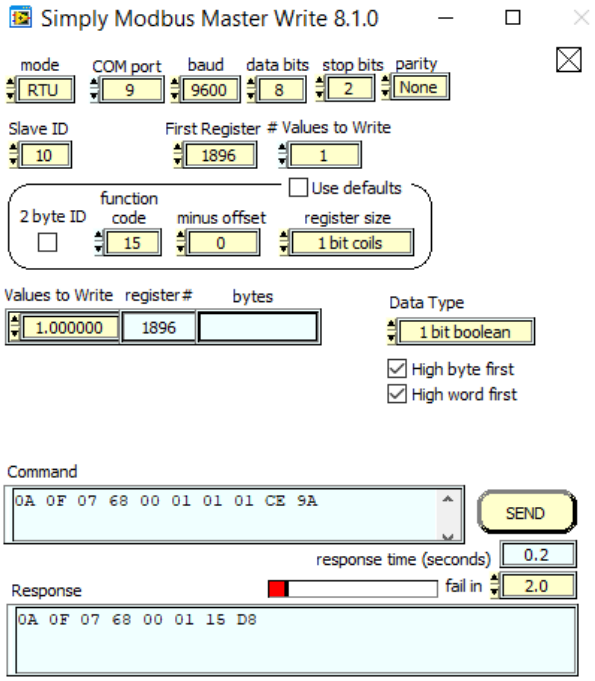


## 5.10 Write Coil Registers (1 bit coils)

Function Code 15

Write to unit address 10, using function code 15, set coil 1896 to 1.

| | Unit | Func | 1St Coil | No Of coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 07 68 | 00 01 | 01 | 01 | CE 9A |
| RX | 0A | 0F | 07 68 | 00 01 | | | 15 D8 |



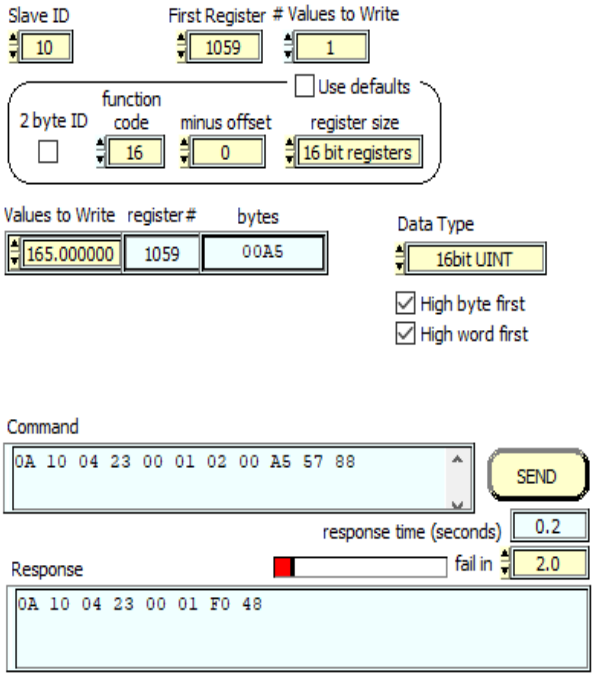
## 5.11 Write Holding Register (8 bit byte)

Function Code: 16
Address offset: 1000

Write a 16 bit integer to address 59, and format value as an 8 bit byte
Address accessed: 1059
Value written: 165

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 04 23 | 00 01 | 02 | 00 A5 | 57 88 |
| RX | 0A | 10 | 04 23 | 00 01 | | | F0 48 |

The first byte is null data (zero) and is ignored, the second byte is the byte written.

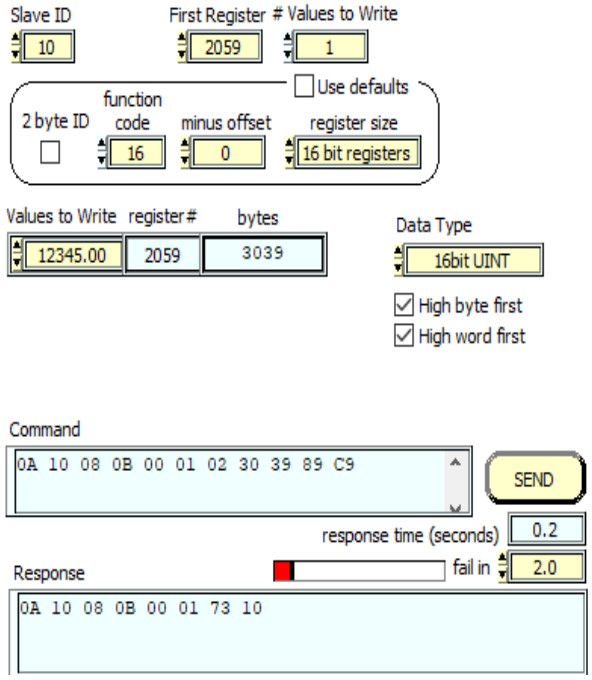


## 5.12 Write Holding Register (16 bit integer)

Function Code: 16
Address offset: 2000

Write a 16 bit integer to address 59, and format value as a 16 bit integer
Address accessed: 2059
Value written: 12345

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 08 0B | 00 01 | 02 | 30 39 | 89 C9 |
| RX | 0A | 10 | 08 0B | 00 01 | | | 73 10 |



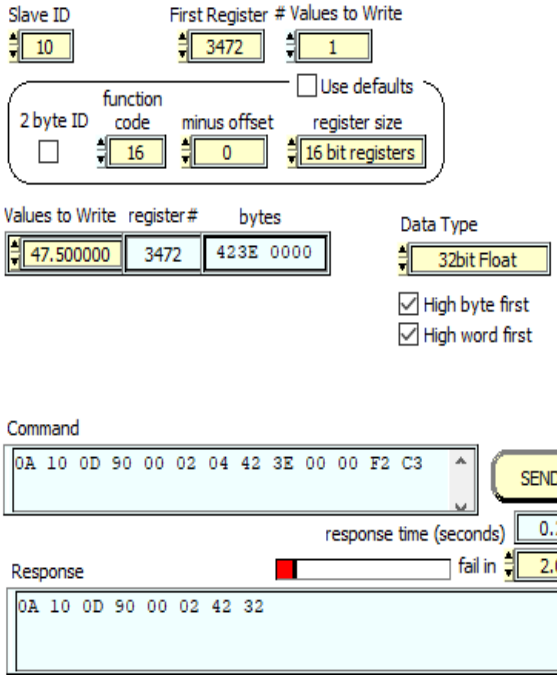
## 5.13 Write Holding Register (24 bit float)

Function Code: 16
Address offset: 3000

Write a 32 bit float to address 472, and format value as a 24 bit float
Address accessed: 3472
Value written: 47.5

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0D 90 | 00 02 | 04 | 42 3E 00 00 | F2 C3 |
| RX | 0A | 10 | 0D 90 | 00 02 | | | 42 32 |

The forth byte is null data (zero) and is ignored, the first to third bytes is the data written.

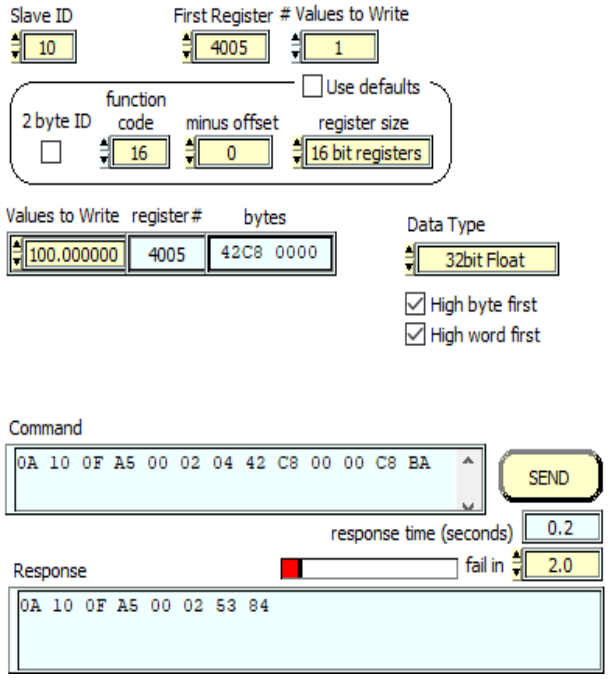


## 5.14 Write Holding Register (32 bit float)

Function Code: 16
Address offset: 4000

Write a 32 bit float to address 5, and format value as a 32 bit float
Address accessed: 4005
Value written: 100

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0F A5 | 00 02 | 04 | 42 C8 00 00 | C8 BA |
| RX | 0A | 10 | 0F A5 | 00 02 | | | 53 84 |

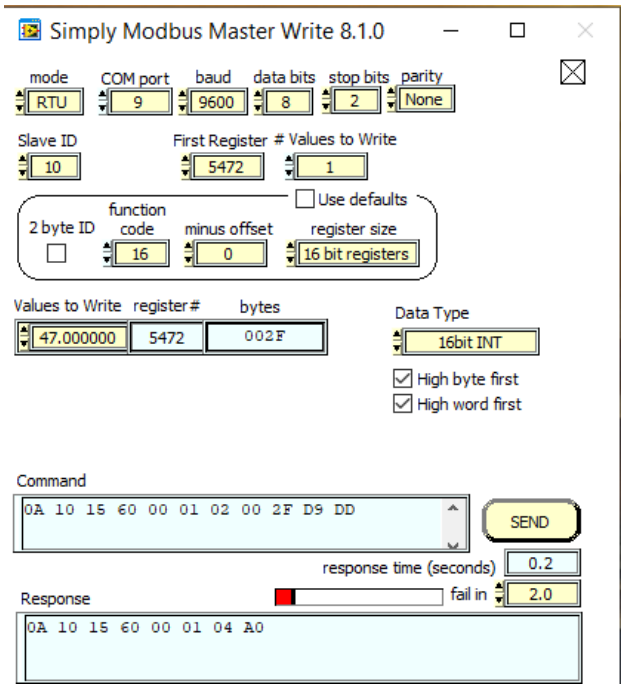


## 5.15 Write Holding Register (24 bit float, using a 16 bit integer)

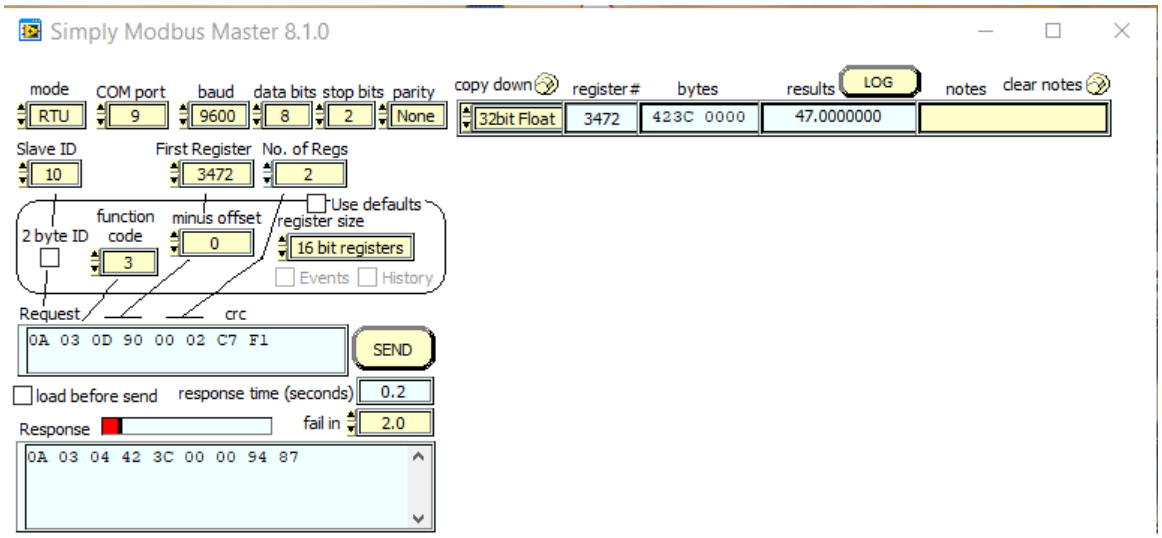
Function Code: 16
Address offset: 5000

Write a 16 bit integer to address 472, and format value as a 24 bit float
Address accessed: 5472
Value written: 47

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 15 60 | 00 01 | 02 | 00 2F | D9 DD |
| RX | 0A | 10 | 15 60 | 00 01 | | | 04 A0 |




Verification:-

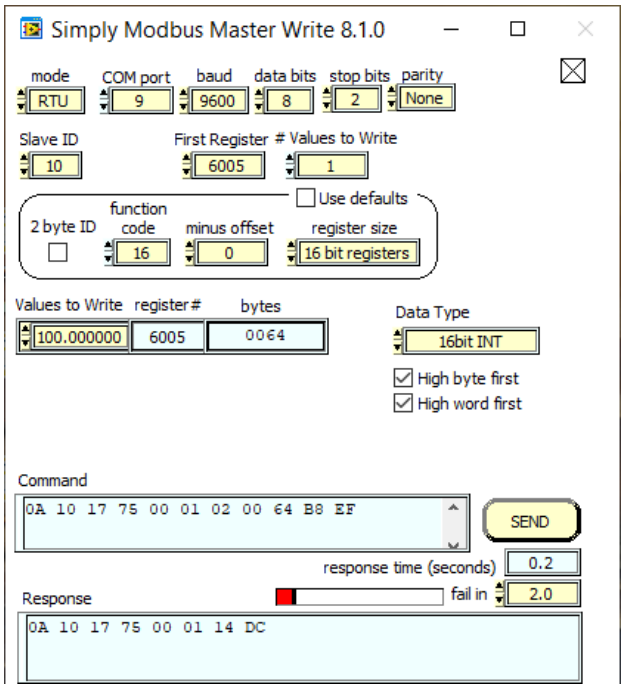


## 5.16 Write Holding Register (32 bit float, using a 16 bit integer)

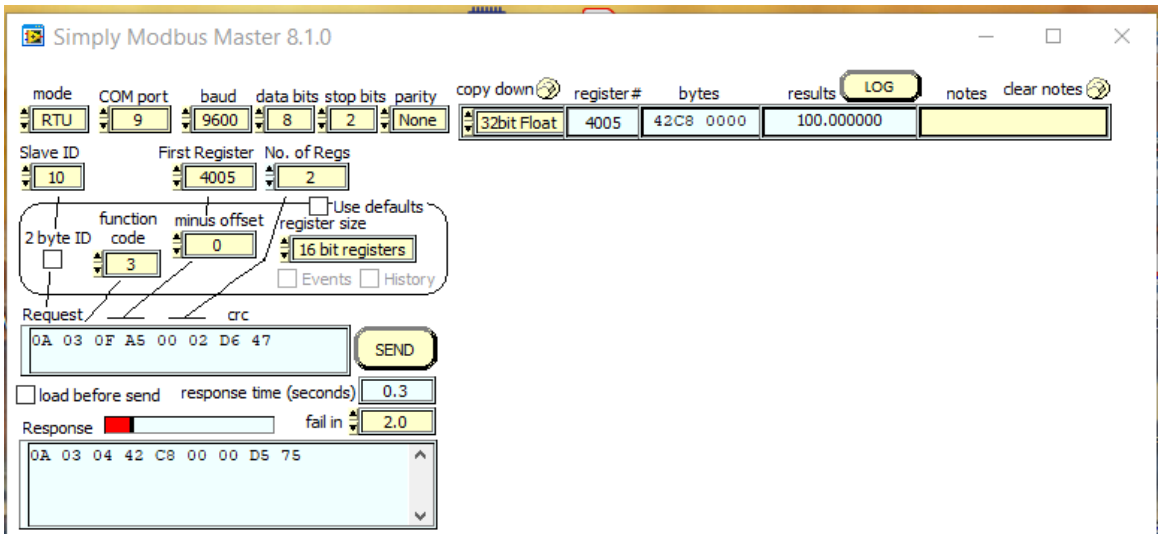
Function Code: 16
Address offset: 6000

Write a 16 bit integer to address 5, and format value as a 32 bit float
Address accessed: 6005
Value written: 100

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 17 75 | 00 01 | 02 | 00 64 | B8 EF |
| RX | 0A | 10 | 17 75 | 00 01 | | | 14 DC |




Verification:-

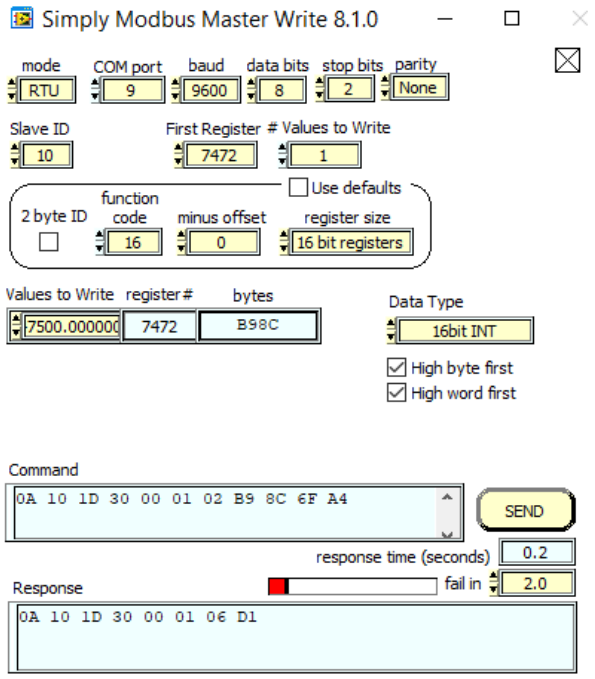


## 5.17 Write Holding Register (24 bit float, /1000, using a 16 bit integer)

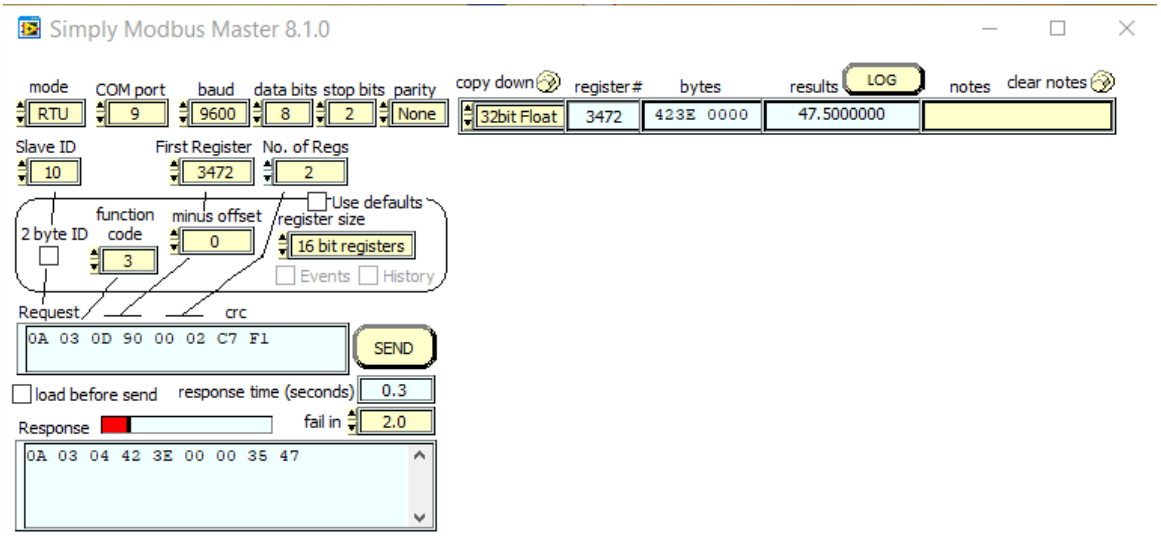
Function Code: 16
Address offset: 7000

Write a 16 bit integer to address 472, divide by 1000, and format value as a 24 bit float
Address accessed: 7472
Value written: 47500 (represents 47.5)

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 1D 30 | 00 01 | 02 | B9 8C | 6F A4 |
| RX | 0A | 10 | 1D 30 | 00 01 | | | 06 D1 |




Verification:-

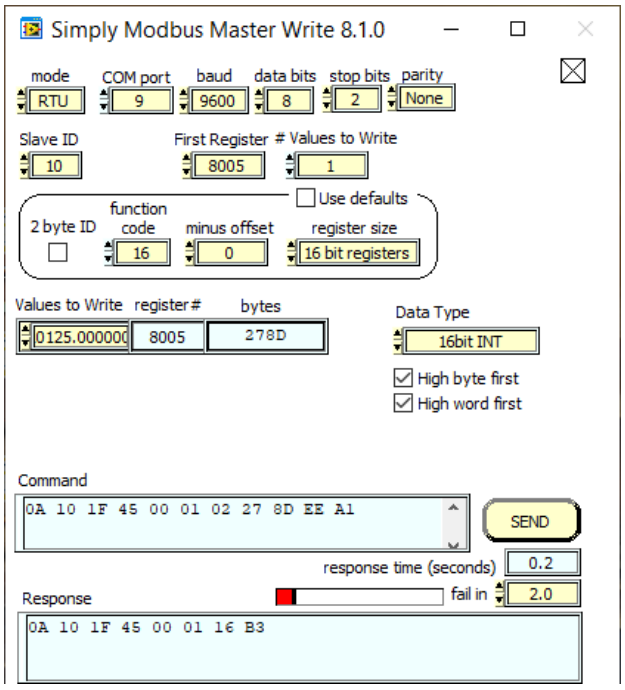


## 5.18 Write Holding Register (32 bit float, /1000, using a 16 bit integer)

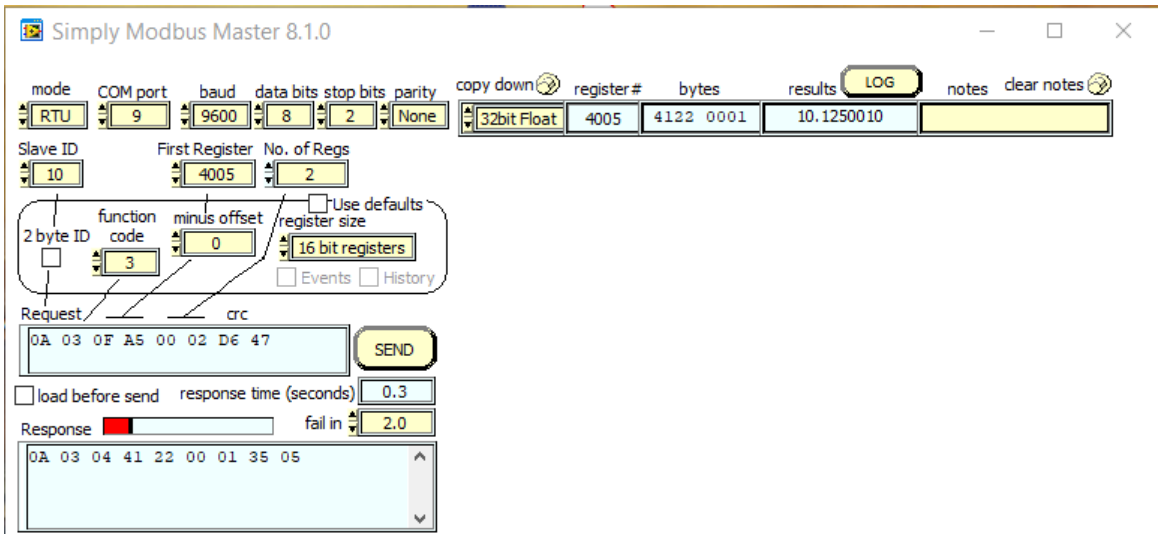
Function Code: 16
Address offset: 8000

Write a 16 bit integer to address 5, divide by 1000, and format value as a 32 bit float
Address accessed: 8005
Value written: 10125 (represents 10.125)

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 1F 45 | 00 01 | 02 | 27 8D | EE A1 |
| RX | 0A | 10 | 1F 45 | 00 01 | | | 16 B3 |




Verification:-



# 6 Product Configuration

All settings are held in temporary storage and are lost on power removal.
To ensure the settings are retained after power cycling, the following command must be sent after the last configuration change.

### MAKE SETTINGS PERMANENT

| | | |
|---|---|---|
| Address | 1767 | |
| Function Code | 16 | Write |
| Value | 67 | Settings stored |

Eg.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 06 0E | 00 01 | 02 | 00 32 | 33 9B |
| RX | 0A | 10 | 06 0E | 00 01 | | | 61 F9 |

Menu ID | Function

## 1.0.0 AUTOSET

### 1.1.0 CHOOSE AUTO SETUP SETTING

#### 1.1.1 Select auto set mode

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1239=1<br>1240=0 | Over |
| | 1239=0<br>1240=1 | Under |
| | 1239=1<br>1240=1 | Both |
| | 1239=0<br>1240=0 | Off |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 04 D7 | 00 02 | | | 0D B8 |
| RX | 0A | 01 | | | 01 | 03<br>00000011 (binary) | 13 AD |

Bits D0 and D1 of the data (03) both being set indicate that AutoSet is configured for both Over and Under alarms (ignore the 0 bits).

Eg. Set unit for AutoSet Over

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 04 D7 | 00 01 | 01 | 01 | DB 72 |
| RX | 0A | 0F | 04 D7 | 00 01 | | | 24 78 |

Clear the Under coil

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 04 D8 | 00 01 | 01 | 00 | 4E 7B |
| RX | 0A | 0F | 04 D8 | 00 01 | | | 14 7B |

Note. Writing to coils is only supported as single coils, therefore requiring two messages.

### 1.1.2 Max main margin (HMI Relay 1) Sensor alarm 1

#### Using 32 bit floats

| | | |
|---|---|---|
| Address | **4**088 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0.0-150.0 | % |

Eg. Read AutoSet Main Alarm Over Margin value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0F F8 | 00 02 | | | 47 95 |
| RX | 0A | 03 | | | 04 | 41 A0 00 00 | 54 ED |

The Margin is 20.0%

Eg. Set Margin to 25.0%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0F F8 | 00 02 | 04 | 41 C8 00 00 | 0C 5B |
| RX | 0A | 10 | 0F F8 | 00 02 | | | C2 56 |

### Using 16 bit integers

| | | |
|---|---|---|
| Address | **6**088 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150 | % |

Eg. Read AutoSet Main Alarm Over Margin value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 17 C8 | 00 01 | | | 01 3B |
| RX | 0A | 03 | | | 02 | 00 14 | 1D 8A |

The Margin is 20%

Eg. Set Margin to 25%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 17 C8 | 00 01 | 02 | 00 19 | 63 E3 |
| RX | 0A | 10 | 17 C8 | 00 01 | | | 84 F8 |

### Using 16 bit integers *0.001

| | | |
|---|---|---|
| Address | **8**088 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0.000-32.767 | % |

Eg. Read AutoSet Main Alarm Over Margin value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 1F 98 | 00 01 | | | 03 4A |
| RX | 0A | 03 | | | 02 | 56 EA | A3 AA |

The Margin is 22250 (22.250%)

Eg. Set Margin to 22.25%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 1F 98 | 00 01 | 02 | 56 EA | 99 96 |
| RX | 0A | 10 | 1F 98 | 00 01 | | | 86 89 |

### 1.1.3 Max Pre margin (HMI Relay 2) Sensor alarm 3

| | | |
|---|---|---|
| Address | 4164 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150 | % |

Eg. Read AutoSet Pre Alarm Over Margin value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 44 | 00 02 | | | 81 A5 |
| RX | 0A | 03 | | | 04 | 41 20 00 | 55 05 |

The Margin is 10%

Eg. Set Margin to 15%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 44 | 00 02 | 04 | 71 70 00 00 | 0B 6F |
| RX | 0A | 10 | 10 44 | 00 02 | | | 04 66 |

Note. If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 1.1.4 Min pre margin (HMI Relay 2) Sensor alarm 4

| | | |
|---|---|---|
| Address | 4202 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150 | % |

Eg. Read AutoSet Pre Alarm Under Margin value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 6A | 00 02 | | | E1 AC |
| RX | 0A | 03 | | | 04 | 41 20 00 00 | 55 05 |

The Margin is 10%

Eg. Set Margin to 5%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 6A | 00 02 | 04 | 40 A0 00 00 | 88 FE |
| RX | 0A | 10 | 10 6A | 00 02 | | | 64 6F |

Note. If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 1.1.5 Min main margin (HMI Relay 1) Sensor alarm 2

| | | |
|---|---|---|
| Address | 4126 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150 | % |

Eg. Read AutoSet Main Alarm Under Margin value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 1E | 00 02 | | | A1 B6 |
| RX | 0A | 03 | | | 04 | 41 A0 00 00 | 54 ED |

The Margin is 20%

Eg. Set Margin to 30%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 1E | 00 02 | 04 | 41 F0 00 00 | 8F C4 |
| RX | 0A | 10 | 10 1E | 00 02 | | | 24 75 |

### 1.1.6 Apply Autoset

This command starts the AutoSet function (only if the motor is running).

| | | |
|---|---|---|
| Address | 1766 | |
| Function Code | 16 | Write |
| Value | 66 | Start AutoSet function |

Eg.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 06 E6 | 00 01 | 02 | 00 42 | 25 57 |
| RX | 0A | 10 | 06 E6 | 00 01 | | | E1 CD |

00 is data that is ignored when written, and null data when read.

## 2.0.0 CONFIGURATION

### 2.1.0 PARAMETER LOCK/ UNLOCK

### 2.1.1 Parameter lock/ unlock code

### 2.2.0 RATED MOTOR POWER

### 2.2.1 Choose KW or HP

| | | |
|---|---|---|
| Address | 1079 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 4<br>7 | KW<br>HP |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 04 37 | 00 01 | | | 35 8F |
| RX | 0A | 03 | | | 02 | 00 04 | 1C 46 |

The current state is 4, which indicates the unit is configured for KW operation

Eg. Set unit for HP operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 04 37 | 00 01 | 02 | 00 07 | D5 25 |
| RX | 0A | 10 | 04 37 | 00 01 | | | B0 4C |

### 2.2.2 Configure Rated Motor Power KW / HP

| | | |
|---|---|---|
| Address | 3472 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0.1-999 | KW / HP |

Eg. Read current rated motor power

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0D 90 | 00 02 | | | C7 F1 |
| RX | 0A | 03 | | | 04 | 42 3E 00 00 | 35 47 |

The motor power is 47.5 KW or HP.

Eg. Set rated motor power to 15

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0D 90 | 00 02 | 04 | 41 70 00 00 | 92 90 |
| RX | 0A | 10 | 0D 90 | 00 02 | | | 42 32 |

00 is ignored (32 bit float is truncated to 24 bit float)

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

## 2.3.0 START DELAY

### 2.3.1 Configure start delay

| | | |
|---|---|---|
| Address | 1490 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-255 | Sec |

Eg. Read current start delay

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 D2 | 00 01 | | | 25 84 |
| RX | 0A | 03 | | | 02 | 00 02 | 9C 44 |

The start delay is 2 seconds (ignore the 00)

Eg. Set start delay to 5 seconds

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 D2 | 00 01 | 02 | 00 05 | 52 11 |
| RX | 0A | 10 | 05 D2 | 00 01 | | | A0 47 |

00 is ignored

## 2.4.0 PRIMARY CT CURRENT

### 2.4.1 Configure primary CT current

| | | |
|---|---|---|
| Address | 4005 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 5-1000 | A |

Eg. Read Primary CT current value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0F A5 | 00 02 | | | D6 47 |
| RX | 0A | 03 | | | 04 | 42 C8 00 00 | D5 75 |

The CT primary is 100A

Eg. Set CT Primary to 5A

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0F A5 | 00 02 | 04 | 40 A0 00 00 | 48 DE |
| RX | 0A | 10 | 0F A5 | 00 02 | | | 42 32 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

## 2.5.0 NUMBER OF TURNS OF THE PRIMARY WIRE THROUGH THE CT

### 2.5.1 Turns value

| | | |
|---|---|---|
| Address | 1478 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 1-10 | Turns |

Eg. Read Primary Turns

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 Cd | 00 01 | | | 65 80 |
| RX | 0A | 03 | | | 02 | 00 01 | DC 45 |

The start delay is 2 seconds (ignore the 00)

Eg. Set Primary Turns to 10 Turns

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 C6 | 00 01 | 02 | 00 0A | 11 01 |
| RX | 0A | 10 | 05 C6 | 00 01 | | | E0 43 |

00 is ignored

## 2.6.0 NUMBER OF PHASES

### 2.6.1 Configure number of phases

| | | |
|---|---|---|
| Address | 1000 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0<br>1<br>2 | Single Phase<br>Split Phase<br>Three Phase |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 03 E8 | 00 01 | | | 05 01 |
| RX | 0A | 03 | | | 02 | 00 02 | 9C 44 |

The current state is 2, which indicates the unit is configured for 3 phase operation

Eg. Set unit for split phase operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 03 E8 | 00 01 | 02 | 00 01 | 30 88 |
| RX | 0A | 10 | 03 E8 | 00 01 | | | 80 C2 |

### 2.7.0 DEFAULT VALUE

### 2.7.1 Default Parameter, "main alarm" ,"pre alarm" and display measurement

| | | |
|---|---|---|
| Address | 1031 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 10<br>4<br>11 | PCT<br>KW<br>HP |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 04 07 | 00 01 | | | 35 80 |
| RX | 0A | 03 | | | 02 | 00 0A | 9D 82 |

The current state is 10, which indicates the unit is configured for PCT operation

Eg. Set unit for KW operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 04 07 | 00 01 | 02 | 00 04 | 90 D4 |
| RX | 0A | 10 | 04 07 | 00 01 | | | B0 43 |

### 2.7.2 Auto scroll of values

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1235=1 | Yes |
| | 1235=0 | No |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 04 D3 | 00 01 | | | 0C 78 |
| RX | 0A | 01 | | | 01 | 00<br>00000000 (binary) | 53 AC |

The current state indicates the unit is configured for AutoScroll Disable

Eg. Set unit for AutoScroll Enable

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 04 D3 | 00 01 | 01 | 01<br>00000001 (binary) | 2A B2 |
| RX | 0A | 0F | 04 D3 | 00 01 | | | 65 B9 |

## 2.8.0 MOTOR OPERATING VOLTAGE

### 2.8.1 Configure Operating Voltage

| | | |
|---|---|---|
| Address | 4240 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 1-600 | V |

Eg. Read Operating Voltage

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 90 | 00 02 | | | C1 9D |
| RX | 0A | 03 | | | 04 | 43 BE 00 00 | 35 53 |

The Operating Voltage is 380V

Eg. Set Operating Voltage to 477V

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 90 | 00 02 | 04 | 43 EE 80 00 | 06 56 |
| RX | 0A | 10 | 10 90 | 00 02 | | | 44 5E |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

## 2.9.0 EVENT LOG TIME AND DATE

### 2.9.1 Event log time. Hour.Minutes.Seconds

### 2.9.2 Event log date. Year.month.day

## 3.0.0 MAIN ALARM, RELAY 1.

### 3.1.0 MAIN ALARM SETTINGS

#### 3.1.1 Configure "OVER", "UNDER", "BOTH" or "OFF"

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1896=1<br>2200=0 | Over |
| | 1896=0<br>2200=1 | Under |
| | 1896=1<br>2200=1 | Both |
| | 1896=0<br>2200=0 | Off |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 07 68 | 00 01 | | | 7C 19 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 08 98 | 00 01 | | | 7F 3E |
| RX | 0A | 01 | | | 01 | 00 (00000000) | 53 AC |

The current state indicates the unit is configured for Main Alarm Over

Eg. Set unit for Main Alarm Under

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 07 86 | 00 01 | 01 | 00 (00000000) | 0F 5A |
| RX | 0A | 0F | 07 86 | 00 01 | | | 15 D8 |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 08 98 | 00 01 | 01 | 01 (00000001) | 8E 70 |
| RX | 0A | 0F | 08 98 | 00 01 | | | 16 FF |

### 3.1.2 Configure max trigger point.

| | | |
|---|---|---|
| Address | 4084 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150<br>0-745<br>0-999 | %<br>KW<br>HP |

Eg. Read Trigger Point

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0F F4 | 00 02 | | | 87 96 |
| RX | 0A | 03 | | | 04 | 42 FA 00 00 | 74 BA |

The Trigger Point is 125.0

Eg. Set Trigger Point to 245

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0F F4 | 00 02 | 04 | 43 75 00 00 | 9D 92 |
| RX | 0A | 10 | 0F F4 | 00 02 | | | 02 55 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 3.1.3 Configure min trigger point.

| | | |
|---|---|---|
| Address | 4122 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150<br>0-745<br>0-999 | %<br>KW<br>HP |

Eg. Read Trigger Point

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 1A | 00 02 | | | E0 77 |
| RX | 0A | 03 | | | 04 | 42 0C 00 00 | 94 88 |

The Trigger Point is 35.0

Eg. Set Trigger Point to 75

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 1A | 00 02 | 04 | 42 96 00 00 | 6E 6C |
| RX | 0A | 10 | 10 1A | 00 02 | | | 65 B4 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 3.2.0 RESPONSE DELAY

### 3.2.1 Configure Response Delay Overload

| | | |
|---|---|---|
| Address | 1482 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0<br>1-255 | 0.5 Sec<br>Number of seconds |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 CA | 00 01 | | | A5 83 |
| RX | 0A | 03 | | | 02 | 00 64 | 1C 6E |

The current state is 64 Hex, which indicates the unit is configured for 100 seconds

Eg. Set unit for 5 second delay operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 CA | 00 01 | 02 | 00 05 | 51 C9 |
| RX | 0A | 10 | 05 CA | 00 01 | | | 20 E0 |

### 3.2.2 Configure Response Delay Underload

| | | |
|---|---|---|
| Address | 1483 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0<br>1-255 | 0.5 Sec<br>Number of seconds |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 CB | 00 01 | | | F4 43 |
| RX | 0A | 03 | | | 02 | 00 0C | 1D 80 |

The current state is 0C Hex, which indicates the unit is configured for 12 seconds

Eg. Set unit for 5 second delay operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 CB | 00 01 | 02 | 00 05 | 50 18 |
| RX | 0A | 10 | 05 CB | 00 01 | | | 71 80 |

### 3.3.0 RELAY 1 LATCH

### 3.3.1 Configure Relay 1 Latch Reset

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1909=1<br>2213=1 | Latch function enabled |
| | 1909=0<br>2213=0 | Latch function disabled |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 07 75 | 00 01 | | | EC 1F |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 08 A5 | 00 01 | | | EE F2 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

The current state indicates the unit is configured for Relay 1 Latch On

Eg. Set unit for Relay 1 Latch Off

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 07 75 | 00 01 | 01 | 01 (00000001) | E3 58 |
| RX | 0A | 0F | 07 75 | 00 01 | | | 85 DE |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 08 A5 | 00 01 | 01 | 00 (00000000) | 22 75 |
| RX | 0A | 0F | 08 A5 | 00 01 | | | 87 33 |

### 3.3.2 Configure Relay 1 Hysteresis %

| | | |
|---|---|---|
| Address | 4092 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-50 | % |

Eg. Read Hysteresis

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0F FC | 00 02 | | | 06 54 |
| RX | 0A | 03 | | | 04 | 00 00 00 00 | 40 F3 |

The Hysteresis is 0.0%

Eg. Set Hysteresis to 15%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0F FC | 00 02 | 04 | 41 70 00 00 | 8D 8D |
| RX | 0A | 10 | 0F FC | 00 02 | | | 83 97 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 3.3.3 Configure Relay 1 as Normally Closed or Normally Open

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1640=1 | Normally Closed |
| | 1640=0 | Normally Open |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 06 68 | 00 01 | | | 7D E5 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

The current state indicates the unit is configured for Relay 1 Normally Closed

Eg. Set unit for Relay 1 Normally Open

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 06 68 | 00 01 | 01 | 00 (00000000) | 0E 8B |
| RX | 0A | 0F | 06 68 | 00 01 | | | 14 24 |

## 4.0.0 PRE ALARM, RELAY 2.

### 4.1.0 PRE ALARM SETTINGS

#### 4.1.1 Configure "OVER", "UNDER", "BOTH" or "OFF"

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 2504=1<br>2808=0 | Over |
| | 2504=0<br>2808=1 | Under |
| | 2504=1<br>2808=1 | Both |
| | 2504=0<br>2808=0 | Off |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 09 C8 | 00 01 | | | 7E D3 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 0A F8 | 00 01 | | | 7E 98 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

The current state indicates the unit is configured for Pre Alarm Both

Eg. Set unit for Pre Alarm Over

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 09 C8 | 00 01 | 01 | 01 (00000001) | 4F AD |
| RX | 0A | 0F | 09 C8 | 00 01 | | | 17 12 |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 0A F8 | 00 01 | 01 | 00 (00000000) | CE 5A |
| RX | 0A | 0F | 0A F8 | 00 01 | | | 17 59 |

### 4.1.2 Configure max trigger point.

| | | |
|---|---|---|
| Address | 4160 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150<br>0-745<br>0-999 | %<br>KW<br>HP |

Eg. Read Trigger Point

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 40 | 00 02 | | | C0 64 |
| RX | 0A | 03 | | | 04 | 42 C8 00 00 | D5 75 |

The Trigger Point is 100.0

Eg. Set Trigger Point to 108

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 40 | 00 02 | 04 | 42 D8 00 00 | 8B 38 |
| RX | 0A | 10 | 10 40 | 00 02 | | | 45 A7 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 4.1.3 Configure min trigger point.

| Address | 4198 | |
|---|---|---|
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150<br>0-745<br>0-999 | %<br>KW<br>HP |

Eg. Read Trigger Point

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 66 | 00 02 | | | 21 AF |
| RX | 0A | 03 | | | 04 | 00 00 00 00 | 40 F3 |

The Trigger Point is 0.0

Eg. Set Trigger Point to 78

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 66 | 00 02 | 04 | 42 9C 00 00 | 49 1F |
| RX | 0A | 10 | 10 66 | 00 02 | | | A4 6C |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

## 4.2.0 RESPONSE DELAY

### 4.2.1 Configure Response Delay Overload

| Address | 1484 | |
|---|---|---|
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0<br>1-255 | 0.5 Sec<br>Number of seconds |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 CC | 00 01 | | | 45 82 |
| RX | 0A | 03 | | | 02 | 00 64 | 1C 6E |

The current state is 64 Hex, which indicates the unit is configured for 100 seconds

Eg. Set unit for 5 second delay operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 CC | 00 01 | 02 | 00 05 | 51 AF |
| RX | 0A | 10 | 05 CC | 00 01 | | | C0 41 |

### 4.2.2 Configure Response Delay Underload

| | | |
|---|---|---|
| Address | 1485 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0<br>1-255 | 0.5 Sec<br>Number of seconds |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 CD | 00 01 | | | 14 42 |
| RX | 0A | 03 | | | 02 | 00 0C | 1D 80 |

The current state is 0C Hex, which indicates the unit is configured for 12 seconds

Eg. Set unit for 5 second delay operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 CD | 00 01 | 02 | 00 05 | 50 7E |
| RX | 0A | 10 | 05 CD | 00 01 | | | 91 FF |

## 4.3.0 RELAY 2 LATCH

### 4.3.1 Configure Relay 2 Latch Reset

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 2517=1<br>2821=1 | Latch function enabled |
| | 2517=0<br>2821=0 | Latch function disabled |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 09 D5 | 00 01 | | | EE D5 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 0B 05 | 00 01 | | | EE 94 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

The current state indicates the unit is configured for Relay 2 Latch On

Eg. Set unit for Relay 2 Latch Off

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 09 D5 | 00 01 | 01 | 00 (00000000) | 62 6F |
| RX | 0A | 0F | 09 D5 | 00 01 | | | 87 14 |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 0B 05 | 00 01 | 01 | 00 (00000000) | A2 5F |
| RX | 0A | 0F | 0B 05 | 00 01 | | | 87 55 |

### 4.3.2 Configure Relay 2 Hysteresis %

| | | |
|---|---|---|
| Address | 4168 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-50 | % |

Eg. Read Hysteresis

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 48 | 00 02 | | | 41 A6 |
| RX | 0A | 03 | | | 04 | 00 00 00 00 | 40 F3 |

The Hysteresis is 0.0%

Eg. Set Hysteresis to 25%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 48 | 00 02 | 04 | 41 C8 00 00 | 8B 1F |
| RX | 0A | 10 | 10 48 | 00 02 | | | C4 65 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 4.3.3 Configure Relay 2 as Normally Closed or Normally Open

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1641=1 | Normally Closed |
| | 1641=0 | Normally Open |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 06 69 | 00 01 | | | 2C 25 |
| RX | 0A | 01 | | | 01 | 00 (00000000) | 53 AC |

The current state indicates the unit is configured for Relay 2 Normally Open

Eg. Set unit for Relay 2 Normally Closed

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 06 69 | 00 01 | 01 | 01 (00000001) | F2 8B |
| RX | 0A | 0F | 06 69 | 00 01 | | | 45 E4 |

## 5.0.0 GENERAL ALARM, RELAY 3.

### 5.1.0 MONITOR FUNCTION

#### 5.1.1 Configure "OVER", "UNDER", "BOTH" or "OFF"

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 3112=1<br>3416=0 | Over |
| | 3112=0<br>3416=1 | Under |
| | 3112=1<br>3416=1 | Both |
| | 3112=0<br>3416=0 | Off |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 0C 28 | 00 01 | | | 7F E9 |
| RX | 0A | 01 | | | 01 | 00 (00000000) | 53 AC |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 0D 58 | 00 01 | | | 7F CE |
| RX | 0A | 01 | | | 01 | 00 (00000000) | 53 AC |

The current state indicates the unit is configured for General Alarm Off

Eg. Set unit for General Alarm Both

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 0C 28 | 00 01 | 01 | 01 (00000001) | CE 2E |
| RX | 0A | 0F | 0C 28 | 00 01 | | | 16 28 |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 0D 58 | 00 01 | 01 | 01 (00000001) | 8E 34 |
| RX | 0A | 0F | 0D 58 | 00 01 | | | 16 0F |

### 5.1.2 Configure source as percent of motor rated input power, measured input power in KW, measured input power HP or voltage

| | | | |
|---|---|---|---|
| Address | | 1235 | |
| Function Code | | 3<br>16 | Read<br>Write |
| Value | | 10<br>4<br>11<br>1<br>2 | PCT<br>KW<br>HP<br>V (L-L)<br>V (L-N) |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 04 D3 | 00 01 | | | 75 B8 |
| RX | 0A | 03 | | | 02 | 00 01 | DC 45 |

The current state is 1, which indicates the unit is configured for V (L-L) operation

Eg. Set unit for V (L-N) operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 04 D3 | 00 01 | 02 | 00 02 | 02 C2 |
| RX | 0A | 10 | 04 D3 | 00 01 | | | F0 7B |

### 5.1.3 Configure max trigger point, as percent of operating voltage.

| | | |
|---|---|---|
| Address | 4260 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-255 | % |

Eg. Read Trigger Point

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 A4 | 00 02 | | | 80 53 |
| RX | 0A | 03 | | | 04 | 42 DC 00 00 | 95 71 |

The Trigger Point is 110.0%

Eg. Set Trigger Point to 115%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 A4 | 00 02 | 04 | 42 E6 00 00 | E5 4F |
| RX | 0A | 10 | 10 A4 | 00 02 | | | 05 90 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 5.1.4 Configure min trigger point, as percent of operating voltage

| | | |
|---|---|---|
| Address | 4298 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-255 | % |

Eg. Read Trigger Point

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 CA | 00 02 | | | E1 8E |
| RX | 0A | 03 | | | 04 | 42 BE 00 00 | 34 AF |

The Trigger Point is 95.0%

Eg. Set Trigger Point to 92%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 CA | 00 02 | 04 | 42 B8 00 00 | 03 39 |
| RX | 0A | 10 | 10 CA | 00 02 | | | 64 4D |

## 5.2.0 RESPONSE DELAY

### 5.2.1 Configure Response Delay Overload

| | | |
|---|---|---|
| Address | 1486 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0<br>1-255 | 0.5 Sec<br>Number of seconds |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 CE | 00 01 | | | E4 42 |
| RX | 0A | 03 | | | 02 | 00 00 | 1D 85 |

The current state is 64 Hex, which indicates the unit is configured for 100 seconds

Eg. Set unit for 5 second delay operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 CE | 00 01 | 02 | 00 05 | 50 4D |
| RX | 0A | 10 | 05 CE | 00 01 | | | 61 81 |

### 5.2.2 Configure Response Delay Underload

| | | |
|---|---|---|
| Address | 1487 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0<br>1-255 | 0.5 Sec<br>Number of seconds |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 05 CF | 00 01 | | | B5 82 |
| RX | 0A | 03 | | | 02 | 00 00 | 1D 85 |

The current state is 0C Hex, which indicates the unit is configured for 12 seconds

Eg. Set unit for 5 second delay operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 05 CF | 00 01 | 02 | 00 05 | 51 9C |
| RX | 0A | 10 | 05 CF | 00 01 | | | 30 41 |

### 5.3.0 RELAY 3 LATCH

### 5.3.1 Configure Relay 3 Latch Reset

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 3125=1<br>3429=1 | Latch function enabled |
| | 3125=0<br>3429=0 | Latch function disabled |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 0C 35 | 00 01 | | | EF EF |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 0D 65 | 00 01 | | | EE 02 |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

The current state indicates the unit is configured for Relay 3 Latch On

Eg. Set unit for Relay 3 Latch On

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 0C 35 | 00 01 | 01 | 01 (00000001) | 22 2C |
| RX | 0A | 0F | 0C 35 | 00 01 | | | 86 2E |

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 0D 65 | 00 01 | 01 | 01 (00000001) | E3 F1 |
| RX | 0A | 0F | 0D 65 | 00 01 | | | 87 C3 |

### 5.3.2 Configure Relay 3 Hysteresis %

| | | |
|---|---|---|
| Address | 4244 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-50 | % |

Eg. Read Hysteresis

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 10 94 | 00 02 | | | 80 5C |
| RX | 0A | 03 | | | 04 | 00 00 00 00 | 40 F3 |

The Hysteresis is 0.0%

Eg. Set Hysteresis to 12%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 10 94 | 00 02 | 04 | 41 40 00 00 | 06 3C |
| RX | 0A | 10 | 10 94 | 00 02 | | | 05 9F |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 5.3.3 Configure Relay 3 as Normally Closed or Normally Open

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1642=1 | Normally Closed |
| | 1642=0 | Normally Open |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 06 6A | 00 01 | | | DC 25 |
| RX | 0A | 01 | | | 01 | 00 (00000000) | 53 AC |

The current state indicates the unit is configured for Relay 3 Normally Open

Eg. Set unit for Relay 3 Normally Closed

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 06 6A | 00 01 | 01 | 01 (00000001) | B6 8B |
| RX | 0A | 0F | 06 6A | 00 01 | | | B5 E4 |

## 6.0.0 INPUTS / OUTPUTS

### 6.1.0 DIGITAL INPUT

### 6.1.1 Digital input, auto set trigger.

| | | |
|---|---|---|
| Function Code | 1<br>15 | Read<br>Write |
| Address | 1241=1 | Digital input enabled |
| | 1241=0 | Digital input disabled |

Eg. Read current state

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 01 | 04 D9 | 00 01 | | | 2C 7A |
| RX | 0A | 01 | | | 01 | 01 (00000001) | 92 6C |

The current state indicates the unit is configured for the digital input to activate Autoset

Eg. Deactivate digital AutoSet

| | Unit | Func | 1St Coil | No of Coils | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 0F | 04 D9 | 00 01 | 01 | 00 (00000000) | 73 73 |
| RX | 0A | 0F | 04 D9 | 00 01 | | | 45 BB |

### 6.2.0 ANALOGUE OUTPUT

### 6.2.1 Configure Analogue output source (measured power in percent of rated power)

| | | |
|---|---|---|
| Address | 1059 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 10 | PCT |

Eg. Read current state

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 04 23 | 00 01 | | | 75 8B |
| RX | 0A | 03 | | | 02 | 00 0A | 9D 82 |

The current state is 0A Hex, which indicates the unit is configured for 10 - PCT

Eg. Set unit for PCT operation

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 04 23 | 00 01 | 02 | 00 0A | 17 F4 |
| RX | 0A | 10 | 04 23 | 00 01 | | | F0 48 |

### 6.2.2 Configure range 4mA

| | | |
|---|---|---|
| Address | 4061 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150 | % |

Eg. Read 4mA value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0F DD | 00 02 | | | 56 5E |
| RX | 0A | 03 | | | 04 | 41 20 00 00 | 55 05 |

The 4mA value occurs at 10%

Eg. Set 4mA value to 12.34%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0F DD | 00 02 | 04 | 41 45 70 A4 | 7A 2C |
| RX | 0A | 10 | 0F DD | 00 02 | | | D3 9D |

**Note:** 41 45 70 A4 represents 12.3400002% as the closest approximation.
**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 6.2.3 Configure range 20mA

| | | |
|---|---|---|
| Address | 4065 | |
| Function Code | 3<br>16 | Read<br>Write |
| Value | 0-150 | % |

Eg. Read 20mA value

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 03 | 0F E1 | 00 02 | | | 96 52 |
| RX | 0A | 03 | | | 04 | 42 C8 00 00 | D5 75 |

The 20mA value occurs at 100%

Eg. Set 20mA value to 125%

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 0F E1 | 00 02 | 04 | 42 FA 00 00 | 6C B6 |
| RX | 0A | 10 | 0F E1 | 00 02 | | | 13 91 |

**Note:** If PLC does not support floats, please refer to section 6 menu item 1.12 for examples using integers.

### 6.3.0 MODBUS

Modbus baud rate, user ID, and parity are not configurable due to ability to render communications inoperable.

## MISCELLANEOUS.

### RESET LATCHED ALARMS.

Any alarms that have activated, and are configured for latching operation, may be cleared using the following command.

| | | |
|---|---|---|
| Address | 1764 | |
| Function Code | 16 | Write |
| Value | 64 | Alarms reset |

Eg.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 06 E4 | 00 01 | 02 | 00 40 | A5 74 |
| RX | 0A | 10 | 06 E4 | 00 01 | | | 40 0D |

### CLEAR THE MOTOR RUN TIMER.

**Note:** This is password protected on the HMI.

This command clears the motor run timer.

| | | |
|---|---|---|
| Address | 1550 | |
| Function Code | 16 | Write |
| Value | 50 | Clear timer |

Eg.

| | Unit | Func | Address | No Of 16 bit Reg | Bytes | Data | Checksum |
|---|---|---|---|---|---|---|---|
| TX | 0A | 10 | 06 0E | 00 01 | 02 | 00 32 | 33 9B |
| RX | 0A | 10 | 06 0E | 00 01 | | | 61 F9 |

# 7 Notes

# 8 Summary

| Function | Coil | 8 bit Byte | 16 bit integer | 24 bit float | 32 bit float | 16 bit integer | 16 bit integer | Shifted 16 bit integer | Shifted 16 bit integer |
|---|---|---|---|---|---|---|---|---|---|
| Make Settings Permanent. | | 1767 | | | | | | | |
| | | | | | | | | | |
| **AUTOSET** | | | | | | | | | |
| Select auto set mode | 1239<br>1240 | | | | | | | | |
| Max main margin (HMI Relay 1) Sensor alarm 1 | | | | | 4088 | | 6088 | | 8088 |
| Max Pre margin (HMI Relay 2) Sensor alarm 3 | | | | | 4164 | | 6164 | | 8164 |
| Min pre margin (HMI Relay 2) Sensor alarm 4 | | | | | 4202 | | 6202 | | 8202 |
| Min main margin (HMI Relay 1) Sensor alarm 2 | | | | | 4126 | | 6126 | | 8126 |
| Apply Autoset | | 1766 | | | | | | | |
| | | | | | | | | | |
| **CONFIGURATION** | | | | | | | | | |
| RATED MOTOR POWER<br>Choose KW or HP | | 1079 | | | | | | | |
| Configure Rated Motor Power KW / HP | | | | 3472 | | 5472 | | 7472 | |
| Configure start delay | | 1490 | | | | | | | |
| Configure primary CT current | | | | | 4005 | | 6005 | | 8005 |
| Primary Turns | | 1478 | | | | | | | |
| Configure number of phases | | 1000 | | | | | | | |
| Default Parameter | | 1031 | | | | | | | |
| Auto scroll of values | 1235 | | | | | | | | |
| Configure Operating Voltage | | | | | 4240 | | 6240 | | 8240 |
| | | | | | | | | | |
| **MAIN ALARM – RELAY 1** | | | | | | | | | |
| Configure "OVER", "UNDER", "BOTH" or "OFF" | 1896<br>2200 | | | | | | | | |
| Configure max trigger point | | | | | 4084 | | 6084 | | 8084 |
| Configure min trigger point | | | | | 4122 | | 6122 | | 8122 |
| Configure Response Delay Overload | | 1482 | | | | | | | |
| Configure Response Delay Underload | | 1483 | | | | | | | |
| Configure Relay 1 Latch Reset | 1909<br>2213 | | | | | | | | |
| Configure Relay 1 Hysteresis % | | | | | 4092 | | 6092 | | 8092 |
| Configure Relay 1 as Normally Closed or Normally Open | 1640 | | | | | | | | |
| | | | | | | | | | |
| **PRE ALARM – RELAY 2** | | | | | | | | | |
| Pre alarm, relay 2. Configure "OVER", "UNDER", "BOTH" or "OFF" | 2504<br>2808 | | | | | | | | |
| Configure max trigger point. | | | | | 4160 | | 6160 | | 8160 |
| Configure min trigger point | | | | | 4198 | | 6198 | | 8198 |
| Configure Response Delay Overload | | 1484 | | | | | | | |
| Configure Response Delay Underload | | 1485 | | | | | | | |
| Configure Relay 2 Latch Reset | 2517<br>2821 | | | | | | | | |
| Configure Relay 2 Hysteresis % | | | | | 4168 | | 6168 | | 8168 |

| Function | Coil | 8 bit Byte | 16 bit integer | 24 bit float | 32 bit float | 16 bit integer | 16 bit integer | Shifted 16 bit integer | Shifted 16 bit integer |
|---|---|---|---|---|---|---|---|---|---|
| Configure Relay 2 as Normally Closed or Normally Open | 1641 | | | | | | | | |
| | | | | | | | | | |
| **GENERAL ALARM – RELAY 5** | | | | | | | | | |
| General alarm, relay 3 Configure "OVER", "UNDER", "BOTH" or "OFF" | 3112<br>3416 | | | | | | | | |
| Configure source as percent of … | | 1235 | | | | | | | |
| Configure max trigger point, as percent of | | | | | 4260 | | 6260 | | 8260 |
| Configure min trigger point, as percent of | | | | | 4298 | | 6298 | | 8298 |
| Configure Response Delay Overload | | 1486 | | | | | | | |
| Configure Response Delay Underload | | 1487 | | | | | | | |
| Configure Relay 3 Latch Reset | 3125<br>3429 | | | | | | | | |
| Configure Relay 3 Hysteresis % | | | | | 4244 | | 6244 | | 8244 |
| Configure Relay 3 as Normally Closed or Normally Open | 1642 | | | | | | | | |
| | | | | | | | | | |
| **INPUTS/OUTPUTS** | | | | | | | | | |
| Digital input, auto set trigger | 1241 | | | | | | | | |
| Configure Analogue output source | | 1059 | | | | | | | |
| Configure range 4mA | | | | | 4061 | | 6061 | | 8061 |
| Configure range 20mA | | | | | 4065 | | 6065 | | 8065 |
| | | | | | | | | | |
| **MISCELLANEOUS** | | | | | | | | | |
| Reset Latched Alarms. | | 1764 | | | | | | | |
| Clear the Motor Run Timer | | 1550 | | | | | | | |